APPENDIX A: FINAL REGULATORY FLEXIBILITY ANALYSIS

As required by the Regulatory Flexibility Act of 1980, as amended (RFA),[264] an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the *Notice of Proposed Rule Making* (*NPRM*) in this proceeding in WT Docket No. 02-146. The Commission sought public comment on the proposals in the *NPRM*, including on the IFRA. This present Final Regulatory Flexibility Analysis (FRFA) conforms to the RFA.

A. Need for, and Purpose of this Action

In this *Report and Order*, we adopt rules for the licensing and operation of the 71-76 GHz, 81-86 GHz and 92-95 GHz (70-80-90 GHz) spectrum bands. Currently, there are no rules in place for these bands. The rules we adopt implement non-exclusive, nationwide licensing with site-by-site registration for these bands. We believe that this approach will also stimulate investment in new technologies, provide a critical means of achieving greater spectrum efficiency and promote research and development.

B. Issues Raised in Response to the IRFA

No comments were filed in response to the IRFA.

C. *Description and Estimate of the Small Entities to Which Rules Will Apply*

The Commission will apply the definition of small entities developed for licensees in the 39 GHz band to licensees in the 70-80-90 GHz bands, as follows:

The SBA has developed a small business size standard for Cellular and Other Wireless telecommunication, which consists of all such firms having 1,500 or fewer employees.[265] According to Census Bureau data for 1997, in this category there was a total of 977 firms that operated for the entire year.[266] Of this total, 965 firms had employment of 999 or fewer employees, and an additional twelve firms had employment of 1,000 employees or more.[267] Thus, under this size standard, the majority of firms can be considered small.

The applicable definition of small entity is the definition under the SBA rules applicable to manufacturers of "Radio and Television Broadcasting and Communications Equipment." According to the SBA's regulation, an RF manufacturer must have 750 or fewer employees in order to qualify as a small business.[268] Census Bureau data indicates that there are 858 companies in the United States that manufacture radio and television broadcasting and communications equipment, and that 778 of these

[264] *See* 5 U.S.C. § 603. The RFA, *see* 5 U.S.C. § 601-612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 847 (1996).

[265] 13 C.F.R. § 121.201, NAICS code 517212 (changed from 513322 in October 2002).

[266] U.S. Census Bureau, 1997 Economic Census, Subject Series: Information, "Establishment and Firm Size (Including Legal Form of Organization)," Table 5.

[267] *Id.* The census data do not provide a more precise estimate of the number of firms that have 1,500 or fewer employees; the largest category provided is "Firms with 1,000 employees or more."

[268] *See* 13 C.F.R. § 121.201, NAICS Code 334220.

firms have fewer than 750 employees and would be classified as small entities.[269] Therefore, we believe that no more than 778 of the companies that manufacture RF equipment qualify as small entities.

D. Description of the Projected Reporting, Recordkeeping, and Other Compliance Requirements

This *Report and Order* modifies the reporting, recordkeeping or other compliance requirements previously proposed in this proceeding. All applicants who are approved will each be granted a single, non-exclusive nationwide license. There is no limit to the number of non-exclusive nationwide licenses that may be granted for these bands, and these licenses will serve as a prerequisite for registering individual links. At the outset, we will continue to coordinate each link under our existing coordination process, which is set forth in section 101.103 of our Rules. Each link must be registered in the Commission's ULS and also requires IRAC coordination. On a going-forward basis, we are working cooperatively with NTIA to facilitate an innovative, streamlined link registration process that will enable licensees to expedite service to the public. The licensing and registration process is the same for all interested parties.

E. Steps Taken to Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered

The required single, non-exclusive nationwide license with site-based registration serves the public interest by simplifying the licensing process and enabling all who are interested to obtain a license to provide service where their targeted market is located. There is no limit to the number of non-exclusive nationwide licenses that may be granted for these bands, so all who qualify as licensees will receive a license. This licensing scheme will allow small businesses the flexibility to provide a variety of services in their chosen markets, because links may be registered anywhere in the United States.

F. Federal Rules That Overlap, Duplicate, or Conflict with These Proposed Rules

None.

G. Report to Congress:

The Commission will send a copy of this *Report and Order,* including this FRFA, in a report to be sent to Congress pursuant to the Congressional Review Act.[270] In addition, the Commission will send a copy of this *Report and Order,* including the FRFA, to the Chief Counsel for Advocacy of the Small Business Administration. A copy of this *Report and Order* and FRFA (or summaries thereof) will also be published in the *Federal Register.*[271]

[269] *See* U.S. Department of Commerce, 1992 Census of Transportation, Communications and Utilities (issued May 1995), NAICS category 334220.

[270] *See* 5 U.S.C. § 801(a)(1)(A).

[271] *See* 5 U.S.C. § 604(b).

APPENDIX B: FINAL RULES

1. For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR Parts 1, 2, 15, 97, and 101 as follows:

PART 1 – PRACTICE AND PROCEDURE

2. The authority citation for Part 1 continues to read as follows:

Authority: 47 U.S.C. 151, 154(i), 154(j), 155, 225, 303(r), 309 and 325(e).

3. Section 1.1307(b)(1) is amended by adding entries to the end of Table 1 as follows:

§ 1.1307 Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.

(a) * * * * *

(b) (1) * * * * *

Service (title 47 CFR rule part)	Evaluation required if:
*	*****
70/80/90 GHz Bands (subpart Q of part 101)	Non-building–mounted antennas: height above ground level to lowest point of antenna < 10 m and power > 1640 W EIRP Building-mounted antennas: power > 1640 W EIRP, licensees are required to attach a label to transceiver antennas that (1) provides adequate notice regarding potential radiofrequency safety hazards, e. g., information regarding the safe minimum separation distance required between users and transceiver antennas; and (2) references the applicable FCC-adopted limits for radio-frequency exposure specified in §1.1310.

PART 2 -- FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

4. The authority citation for part 2 continues to read as follows:

Authority: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

5. Section 2.106, the Table of Frequency Allocations, is amended as follows:

a. Revise pages 81 through 83.

b. In the list of United States (US) Footnotes, revise footnotes US211, US297, and US342; remove footnotes US270 and US377; and add footnotes US387, US388, and US389.

The additions and revisions read as follows:

§ 2.106 Table of Frequency Allocations.

* * * * *

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
65-66 EARTH EXPLORATION-SATELLITE FIXED INTER-SATELLITE MOBILE except aeronautical mobile SPACE RESEARCH 5.547			65-66 EARTH EXPLORATION-SATELLITE FIXED MOBILE except aeronautical mobile SPACE RESEARCH	65-66 EARTH EXPLORATION-SATELLITE FIXED INTER-SATELLITE MOBILE except aeronautical mobile SPACE RESEARCH	
66-71 INTER-SATELLITE MOBILE 5.553 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554			66-71 MOBILE 5.553 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	66-71 INTER-SATELLITE MOBILE 5.553 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	
71-74 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)			71-74 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth) US389		Fixed Microwave (101)
74-76 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE BROADCASTING BROADCASTING-SATELLITE Space research (space-to-Earth) 5.559A 5.561			74-76 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Space research (space-to-Earth) US387 US389	74-76 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE BROADCASTING BROADCASTING-SATELLITE Space research (space-to-Earth) US387 US389	
76-77.5 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149			76-81 RADIOLOCATION	76-77 RADIOLOCATION Amateur	RF Devices (15)
				77-77.5 RADIOLOCATION Amateur Amateur-satellite	Amateur (97)

77.5-78 AMATEUR AMATEUR-SATELLITE Radio astronomy Space research (space-to-Earth) 5.149		77.5-78 RADIOLOCATION AMATEUR AMATEUR-SATELLITE	
78-79 RADIOLOCATION Amateur Amateur-satellite Radio astronomy Space research (space-to-Earth) 5.149 5.560		78-81 RADIOLOCATION Amateur Amateur-satellite	
79-81 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149	5.560	5.560	
81-84 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY Space research (space-to-Earth) 5.149 5.561A	81-84 FIXED FIXED-SATELLITE (Earth-to-space) US297 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY Space research (space-to-Earth) US342 US388 US389		Fixed Microwave (101)
84-86 FIXED FIXED SATELLITE (Earth-to-space) 5.561B MOBILE RADIO ASTRONOMY 5.149	84-86 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY US342 US388 US389		
86-92 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	86-92 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US246		

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
92-94 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149			92-94 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION US342 US388		RF Devices (15) Fixed Microwave (101)
94-94.1 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) Radio astronomy 5.562 5.562A			94-94.1 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) Radio astronomy 5.562 5.562A	94-94.1 RADIOLOCATION Radio astronomy 5.562A	RF Devices (15)
94.1-95 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149			94.1-95 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION US342 US388		RF Devices (15) Fixed Microwave (101)
95-100 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.554			95-100 MOBILE US376 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE Radiolocation 5.149 5.554		
100-102 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341			100-102 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.341 US246		
102-105 FIXED MOBILE RADIO ASTRONOMY 5.149 5.341			102-105 FIXED FIXED-SATELLITE (space-to-Earth) 5.341 US211		

* * * * *

UNITED STATES (US) FOOTNOTES

* * * * *

US211 In the bands 1670-1690, 5000-5250 MHz and 10.7-11.7, 15.1365-15.35, 15.4-15.7, 22.5-22.55, 24-24.05, 31.0-31.3, 31.8-32.0, 40.5-42.5, 102-105, 116-126, 151-164, 176.5-182, 185-190, 231-235, 252-265 GHz, applicants for airborne or space station assignments are urged to take all practicable steps to protect radio astronomy observations in the adjacent bands from harmful interference; however, US74 applies.

* * * * *

US297 The bands 47.2-49.2 GHz and 81-82.5 GHz are also available for feeder links for the broadcasting-satellite service.

* * * * *

US342 In making assignments to stations of other services to which the following bands:

13360-13410 kHz	22.81-22.86 GHz*	150-151 GHz*
25550-25670 kHz	23.07-23.12 GHz*	174.42-175.02 GHz*
37.5-38.25 MHz	31.2-31.3 GHz	177-177.4 GHz*
322-328.6 MHz*	36.43-36.5 GHz*	178.2-178.6 GHz*
1330-1400 MHz*	42.5-43.5 GHz	181-181.46 GHz*
1610.6-1613.8 MHz*	48.94-49.04 GHz*	186.2-186.6 GHz*
1660-1670 MHz	81-86 GHz	250-251 GHz*
3260-3267 MHz*	92-94 GHz	257.5-258 GHz*
3332-3339 MHz*	94.1-95 GHz	261-265 GHz
3345.8-3352.5 MHz*	97.88-98.08 GHz*	262.24-262.76 GHz*
4825-4835 MHz*	140.69-140.98 GHz*	265-275 GHz
14.47-14.5 GHz*	144.68-144.98 GHz*	265.64-266.16 GHz*
22.01-22.21 GHz*	145.45-145.75 GHz*	267.34-267.86 GHz*
22.21-22.5 GHz	146.82-147.12 GHz*	271.74-272.26 GHz*

are allocated (* indicates radio astronomy use for spectral line observations) all practicable steps shall be taken to protect the radio astronomy service from harmful interference. Emissions from spaceborne or airborne stations can be particularly serious sources of interference to the radio astronomy service (see Nos. 4.5 and 4.6 and Article 29 of the ITU Radio Regulations).

* * * * *

US387 The band 75.5-76 GHz is also allocated to the amateur and amateur-satellite services on a secondary basis until January 1, 2006. After that date, the band 75.5-76 GHz shall no longer be available for use by the amateur service or the amateur-satellite service.

US388 In the bands 81-86 GHz, 92-94 GHz, and 94.1-95 GHz and within the coordination distances indicated below, assignments to allocated services shall be coordinated with the following radio astronomy observatories. New observatories shall not receive protection from fixed stations that are licensed to operate in the one hundred most populous urbanized areas as defined by the U.S. Census Bureau for the year 2000. The coordinates listed below are specified in terms of the North American Datum of 1983.

Note: Satisfactory completion of the coordination procedure utilizing the automated mechanism, see §101.1523, will be deemed to establish sufficient separation from radio astronomy observatories, regardless of whether the distances set forth above are met.

Telescope and site	150 kilometer (93 mile) radius centered on:	
	North Latitude	West Longitude
National Radio Astronomy Observatory (NRAO), Robert C. Byrd Telescope, Green Bank, WV	38° 25' 59"	79° 50' 24"
NRAO, Very Large Array, Socorro, NM	34° 04' 44"	107° 37' 06"
University of Arizona 12-m Telescope, Kitt Peak, AZ	31° 57' 10"	111° 36' 50"
BIMA Telescope, Hat Creek, CA	40° 49' 04"	121° 28' 24"
Caltech Telescope, Owens Valley, CA	37° 13' 54"	118° 17' 36"
Five Colleges Observatory, Amherst, MA	42° 23' 33"	72° 20' 40"
Haystack Observatory, Westford, MA	42° 37' 23"	71° 29' 19"
James Clerk Maxwell Telescope, Mauna Kea, HI	19° 49' 33"	155° 28' 20"
Combined Array for Research in Millimeter-wave Astronomy (CARMA), CA	CARMA will be located at a new, high-altitude site in eastern California, expected to be operational in 2004.	
NRAO, Very Long Baseline Array Stations	25 kilometer (15.5 mile) radius centered on:	
	North Latitude	West Longitude
Brewster, WA	48° 07' 52"	119° 41' 00"
Fort Davis, TX	30° 38' 06"	103° 56' 41"
Hancock, NH	42° 56' 01"	71° 59' 12"
Kitt Peak, AZ	31° 57' 23"	111° 36' 45"
Los Alamos, NM	35° 46' 31"	106° 14' 44"
Mauna Kea, HI	19° 48' 05"	155° 27' 19"
North Liberty, IA	41° 46' 17"	91° 34' 27"
Owens Valley, CA	37° 13' 54"	118° 16' 37"
Pie Town, NM	34° 18' 04"	108° 07' 09"
Saint Croix, VI	17° 45' 24"	64° 35' 01"

US389 In the bands 71-76 GHz and 81-86 GHz, stations in the fixed, mobile, and broadcasting services shall not cause harmful interference to, nor claim protection from, Federal Government stations in the fixed-satellite service at any of the following 28 military installations:

Military Installation	State	Nearby city
Redstone Arsenal	AL	Huntsville
Fort Huachuca	AZ	Sierra Vista
Yuma Proving Ground	AZ	Yuma
Beale AFB	CA	Marysville
Camp Parks Reserve Forces Training Area	CA	Dublin
China Lake Naval Air Weapons Station	CA	Ridgecrest
Edwards AFB	CA	Rosamond
Fort Irwin	CA	Barstow
Marine Corps Air Ground Combat Center	CA	Twentynine Palms
Buckley AFB	CO	Aurora (Denver)
Schriever AFB	CO	Colorado Springs
Fort Gordon	GA	Augusta
Naval Satellite Operations Center	GU	Finegayan (Territory of Guam)
Naval Computer and Telecommunications Area Master Station, Pacific	HI	Wahiawa (Oahu Is.)
Fort Detrick	MD	Frederick
Nellis AFB	NV	Las Vegas
Nevada Test Site	NV	Amargosa Valley
Tonapah Test Range Airfield	NV	Tonapah
Cannon AFB	NM	Clovis
White Sands Missile Range	NM	White Sands
Dyess AFB	TX	Abilene
Fort Bliss	TX	El Paso
Fort Sam Houston	TX	San Antonio
Goodfellow AFB	TX	San Angelo
Kelly AFB	TX	San Antonio
Utah Test and Training Range	UT	.....
Fort Belvoir	VA	Alexandria
Naval Satellite Operations Center	VA	Chesapeake

* * * * *

4. Section 2.1091 is revised by amending paragraph (c) to read as follows:

§ 2.1091 Radiofrequency radiation exposure evaluation: mobile devices.

* * * * *

(c) Mobile devices that operate in the Cellular Radiotelephone Service, the Personal Communications Services, the Satellite Communications Services, the General Wireless Communications Service, the Wireless Communications Service, the Maritime Services and the Specialized Mobile Radio Service authorized under subpart H of part 22 of this chapter, part 24 of this chapter, part 25 of this chapter, part 26 of this chapter, part 27 of this chapter, part 80 of this chapter (ship earth stations devices only) and part 90 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if they operate at frequencies of 1.5 GHz or below and their effective radiated power (ERP) is 1.5 watts or more, or if they operate at

frequencies above 1.5 GHz and their ERP is 3 watts or more. Unlicensed personal communications service devices, unlicensed millimeter wave devices and unlicensed NII devices authorized under §§ 15.253, 15.255, and 15.257, and subparts D and E of part 15 of this chapter are also subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if their ERP is 3 watts or more or if they meet the definition of a portable device as specified in § 2.1093 (b) requiring evaluation under the provisions of that section. All other mobile and unlicensed transmitting devices are categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, except as specified in §§ 1.1307(c) and 1.1307(d) of this chapter. Applications for equipment authorization of mobile and unlicensed transmitting devices subject to routine environmental evaluation must contain a statement confirming compliance with the limits specified in paragraph (d) of this section as part of their application. Technical information showing the basis for this statement must be submitted to the Commission upon request.

* * * * *

5. Section 2.1093 is revised by amending paragraph (c) to read as follows:

§ 2.1093 Radiofrequency radiation exposure evaluation: portable devices.

* * * * *

(c) Portable devices that operate in the Cellular Radiotelephone Service, the Personal Communications Service (PCS), the Satellite Communications Services, the General Wireless Communications Service, the Wireless Communications Service, the Maritime Services, the Specialized Mobile Radio Service, the 4.9 GHz Band Service, the Wireless Medical Telemetry Service (WMTS) and the Medical Implant Communications Service (MICS), authorized under subpart H of part 22 of this chapter, parts 24, 25, 26, 27, 80, 90, subparts H and I of part 95 of this chapter, and unlicensed personal communication service, unlicensed NII devices and millimeter wave devices authorized under subparts D and E, § 15.253, § 15.255 and § 15.257 of part 15 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use. All other portable transmitting devices are categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, except as specified in §§ 1.1307(c) and 1.1307(d) of this chapter. Applications for equipment authorization of portable transmitting devices subject to routine environmental evaluation must contain a statement confirming compliance with the limits specified in paragraph (d) of this section as part of their application. Technical information showing the basis for this statement must be submitted to the Commission upon request.

* * * * *

PART 15 – RADIO FREQUENCY DEVICES

6. The authority citation continues to read as follows:

Authority: 47 U.S.C. 154, 302, 303, 304, 307, 336 and 544A

7. Section 15.205 is revised by amending paragraph (d)(4) to read as follows:

§ 15.205 Restricted bands of operation.

* * * * *

(d) * * *

* * * * *

(4) Any equipment operated under the provisions § 15.253, § 15.255 or § 15.257.

* * * * *

8. Section 15.215 is revised by amending paragraphs (a) and (c) to read as follows:

§ 15.215 Additional provisions to the general radiated emission limitations.

(a) The regulations in §§ 15.217 through 15.257 provide alternatives to the general radiated emission limits for intentional radiators operating in specified frequency bands. Unless otherwise stated, there are no restrictions as to the types of operation permitted under these sections.

* * * * *

(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the 20 dB bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

9. Section 15.257 is added to Subpart C to read as follows:

§ 15.257 Operation within the band 92-95 GHz.

(a) Operation of devices under the provisions of this section is limited to indoor use;

(1) Devices operating under the provisions of this section, by the nature of their design, must be capable of operation only indoors. The necessity to operate with a fixed indoor infrastructure, e.g., a transmitter that must be connected to the AC power lines, may be considered sufficient to demonstrate this.

(2) The use of outdoor mounted antennas, e.g., antennas mounted on the outside of a building or on a telephone pole, or any other outdoors infrastructure is prohibited.

(3) The emissions from equipment operated under this section shall not be intentionally directed outside of the building in which the equipment is located, such as through a window or a doorway.

(4) Devices operating under the provisions of this section shall bear the following or similar statement in a conspicuous location on the device or in the instruction manual supplied with the device:

"This equipment may only be operated indoors. Operation outdoors is in violation of 47 U.S.C. 301 and could subject the operator to serious legal penalties."

(b) Operation under the provisions of this section is not permitted on aircraft or satellites.

(c) Within the 92-95 GHz bands, the emission levels shall not exceed the following:

(1) The average power density of any emission, measured during the transmit interval, shall not exceed 9 uW/sq. cm, as measured at 3 meters from the radiating structure, and the peak power density of any emission shall not exceed 18 uW/sq. cm, as measured 3 meters from the radiating structure.

(2) Peak power density shall be measured with an RF detector that has a detection bandwidth that encompasses the band being used and has a video bandwidth of at least 10 MHz, or uses an equivalent measurement method.

(3) The average emission limits shall be calculated based on the measured peak levels, over the actual

time period during which transmission occurs.

(d) Limits on spurious emissions:

(1) The power density of any emissions outside the band being used shall consist solely of spurious emissions.

(2) Radiated emissions below 40 GHz shall not exceed the general limits in § 15.209.

(3) Between 40 GHz and 200 GHz, the level of these emissions shall not exceed 90 pW/cm^2 at a distance of 3 meters.

(4) The levels of the spurious emissions shall not exceed the level of the fundamental emission.

(e) The total peak transmitter output power shall not exceed 500 mW.

(f) Fundamental emissions must be contained within the frequency bands specified in this section during all conditions of operation. Equipment is presumed to operate over the temperature range -20 to +50 degrees Celsius with an input voltage variation of 85% to 115% of rated input voltage, unless justification is presented to demonstrate otherwise.

(g) Regardless of the maximum EIRP and maximum power density levels permitted under this section, devices operating under the provisions of this section are subject to the radiofrequency radiation exposure requirements specified in 47 C.F.R. §§ 1.1307(b), 2.1091, and 2.1093, as appropriate. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

(h) Any transmitter that has received the necessary FCC equipment authorization under the rules of this chapter may be mounted in a group installation for simultaneous operation with one or more other transmitter(s) that have received the necessary FCC equipment authorization, without any additional equipment authorization. However, no transmitter operating under the provisions of this section may be equipped with external phase-locking inputs that permit beam-forming arrays to be realized.

PART 97--AMATEUR RADIO SERVICE

7. The authority citation for Part 97 continues to read as follows:

Authority: 48 Stat. 1066, 1082, as amended; 47 U.S.C. 154, 303. Interpret or apply 48 Stat. 1064-1068, 1081-1105, as amended; 47 U.S.C. 151-155, 301-609, unless otherwise noted.

8. Section 97.303 is revised by adding new paragraph (r)(3) to read as follows:

§ 97.303 Frequency sharing requirements.

* * * * *

(r) * * *

* * * * *

(3) No amateur or amateur-satellite station transmitting in the 75.5-76 GHz segment shall cause interference to, nor is protected from, interference due to the operation of stations in the fixed service. After January 1, 2006, the 75.5-76 GHz segment is no longer allocated to the amateur service or to the amateur-satellite service.

PART 101 – FIXED MICROWAVE SERVICES

9. The authority citation for Part 101 continues to read as follows:

Authority: 47 U.S.C. 154 and 303, unless otherwise noted.

10. Section 101.63 is amended by revising the paragraph to read as follows:

§ 101.63 Period of construction; certification of completion of construction.

(a) Each Station, except in Multichannel Video Distribution and Data Service, Local Multipoint Distribution Services, 24 GHz Service, and the 38.6-40.0 GHz band, authorized under this part must be in operation within 18 months from the initial date of grant.

(b) For the 70 GHz, 80 GHz, and 90 GHz bands, the 12-month construction period will commence on the date of each registration of each individual link; adding links will not change the overall renewal period of the license.

* * * * *

11. Section 101.101 is amended by adding four new entries in numerical order to read as follows:

§ 101.101 Frequency Availability.

Frequency band (MHz)	Radio Service				
	Common carrier (Part 101)	Private radio (Part 101)	Broadcast auxiliary (Part 74)	Other (Parts 15, 21, 22, 24, 25, 74, 78 & 100)	Notes
*	*	*	*	*	**
71,000-76,000	CC.....	OFS.....	.....	25	F/M/TF
81,000-86,000	CC.....	OFS.....	.....	25	F/M/TF
92,000-95,000	CC.....	OFS.....	.....	15	F/M/TF

* * * * *

12. Section 101.107(a) is amended by adding three new entries in numerical order to read as follows:

§ 101.107 Frequency tolerance.

(a) * * *

Frequency (MHz)	Frequency Tolerance (percent)		
	All fixed and base stations	Mobile stations over 3 watts	Mobile stations 3 watts or less
*	*	*	* *
71,000 to 76,000 [9].....	.....	.....	.....
81,000 to 86,000 [9].....	.....	.....	.....
92,000 to 95,000 [9].....	.....	.....	.....

* * *

[9] Equipment authorized to be operated in the 38,600-40,000 MHz, 71,000-76,000 MHz, 81,000-86,000 MHz, 92,000-94,000 MHz and 94,100-95,000 MHz bands are exempt from the frequency tolerance requirement noted in the above table.

* * * * *

13. Section 101.109(c) is amended by removing the entry for "Above 40,000" and adding three new entries in numerical order to read as follows:

§ 101.109 Bandwidth.

(a)* * *

* * * * *

(c) * * *

Frequency band (MHz)	Maximum authorized bandwidth
* *	* * *
38,600 to 40,000.....	50 MHz[7]
71,000 to 76,000.....	(3)
81,000 to 86,000.....	(3)
92,000 to 95,000.....	(3)

* * *

[3] To be specified in authorization. For the bands of: 71 to 76 GHz, 81 to 86 GHz, and 92 to 95 GHz, maximum bandwidth is licensed in segments of 1.25 GHz for the 71-76 and 81-86 GHz bands, one segment of 2 GHz from 92-94 GHz, and one 0.9 GHz segment from 94.1 to 95 GHz, up to a total of 12.9 GHz, or the total of the loaded band if smaller than the assigned bandwidth.

* * * * *

14. Section 101.111(a)(2) is amended by adding paragraph (v) to read as follows:

§ 101.111 Emission limitations.

(a)* * *

* * * * *

(2) * * *

* * * * *

(v) The emission mask for the 71-76 GHz, 81-86 GHz, 92-94 GHz, and 94.1-95 GHz bands used in the equation in paragraph (a)(2)(ii) of this section applies only to the edge of each channel, but not to sub-channels established by licensees. The value of P in the equation is for the percentage removed from the carrier frequency and assumes that the carrier frequency is the center of the actual bandwidth used. The value of B will always be 500 MHz. In the case where a narrower sub-channel is used within the assigned bandwidth, such sub-carrier will be located sufficiently far from the channel edges to satisfy the

emission levels of the mask. The mean output power used in the calculation is the sum of the output power of a fully populated channel.

* * * * *

15. Section 101.113(a) is amended by adding four entries in numerical order and by removing (DbW) and replacing it with (dBW) to read as follows:

§ 101.113 Transmitter power limitations.

(a) * * * * *

Frequency band (MHz)	Maximum Allowable EIRP [1] [2]	
	Fixed (dBW)	Mobile (dBW)
*	*	* * *
71,000-76,000	+55	+55
81,000-86,000	+55	+55
92,000-95,000	+55	+55

* * * * *

16. Section 101.115 is amended by adding three new entries in numerical order to read as follows:

§ 101.115 Directional Antennas.

(a) * * * * *

Frequency (MHz)	Category	Maximum beam width to 3 dB points[1] (included angle in degrees)	Minimum antenna gain (dBi)	Minimum radiation suppression to angle in degrees from centerline of main beam in decibels						
				5° to 10°	10° to 15°	15° to 20°	20° to 30°	30° to 100°	100° to 140°	140° to 180°
71,000 to 76,000	N/A	0.6	50.0	36	40	45	50	55	55	55
81,000 to 86,000	N/A	0.6	50.0	36	40	45	50	55	55	55
92,000 to 95,000	N/A	0.6	50.0	36	40	45	50	55	55	55

* * * * *

17. Section 101.147 is amended by removing the entry for "Above 40,000" and adding four new entries in numerical order in 101.147(a) and adding a new paragraph (z) to read as follows:

§ 101.147 Frequency assignments.

(a) * * *

* * * * *

38,600-40,000 MHz (4)

71,000-76,000 MHz (5) (17)

81,000-86,000 MHz (5) (17)

92,000-94,000 MHz (17)

94,100-95,000 MHz (17)

* * * * *

(z) *71,000-76,000 MHz; 81,000-86,000 MHz; 92,000-94,000 MHz; 94,100--95,000 MHz.*

(1) Those applicants who are approved in accordance with FCC Form 601 will each be granted a single, non-exclusive nationwide license. Site-by-site registration is on a first-come, first-served basis. Registration will be in the Universal Licensing System until the Wireless Telecommunications Bureau announces by public notice, the implementation of a third-party database. See 47 C.F.R. § 101.1523. The sites are currently coordinated on the basis of 47 C.F.R. § 101.103, and may not operate until NTIA approval is received. Licensees may use these bands for any point-to-point non-broadcast service.

(2) Prior links shall be protected to a threshold-to-interference ratio (T/I) level of 1.0 dB of degradation to the static threshold of the protected receiver. Any new link shall not decrease a previous link's desired-to-undesired (D/U) signal ratio below a minimum of 36 dB, unless the earlier link's licensee agrees to accept a lower D/U.

(3) Entities must meet the loading requirements of 47 C.F.R. § 101.141. If it is determined that a licensee has not met the loading requirements, then the database will be modified to limit coordination rights to the spectrum that is loaded and the licensee will lose protection rights on spectrum that has not been loaded.

18. Part 101 is amended by adding a new subpart Q to read as follows:

SUBPART Q – SERVICE AND TECHNICAL RULES FOR THE 70/80/90 GHZ BANDS

Sec.

101.1501 Services areas.
101.1505 Segmentation plan
101.1507 Permissible operations
101.1511 Regulatory status and eligibility
101.1513 License term and renewal expectancy.
101.1523 Sharing and coordination among non-Government licensees and between non-Government and Government services.
101.1525 RF safety.
101.1527 Canadian and Mexican coordination.

101.1501 Service areas.

The 70/80/90 GHz bands are licensed on the basis of non-exclusive nationwide licenses. There is no limit to the number of non-exclusive nationwide licenses that may be granted for these bands, and these licenses will serve as a prerequisite for registering individual links.

§ 101.1505 Segmentation plan.

(a) The 71-76 GHz and 81-86 GHz bands are divided into four unpaired 1.25 GHz segments each (8 total), without assignment of specific channels within the segment. An entity may request any portion of this spectrum, up to 10 GHz (1.25, 2.5, 3.75, 5, 6.25, 7.75 or 10 GHz). The segments may be

aggregated without limit. Pairing is permitted, but only in a standardized manner (e.g., 71-72.25 GHz may be paired only with 81-82.25 GHz, and so on). Licensees are also permitted to register segments less than 1.25 GHz.

(b) The 92-95 GHz band is divided into three segments: 92.0-94.0 GHz and 94.1-95.0 GHz for non-Government and Government users, and 94.0-94.1 GHz for Federal Government use. Pairing is allowed and segments may be aggregated without limit. The bands in (a) above can be included for a possible 12.9 GHz maximum aggregation. Licensees are also permitted to register smaller segments than provided here.

§ 101.1507 Permissible operations.

Licensees may use the 70 GHz, 80 GHz and 90 GHz bands for any point-to-point, non-broadcast service. The segments may be unpaired or paired, but paring will be permitted only in a standardized manner (*e.g.*, 71-72.25 GHz may be paired only with 81-82.25 GHz, and so on). The segments may be aggregated without limit.

§ 101.1511 Regulatory status and eligibility.

(a) Licensees are permitted to provide services on a non-common carrier and/or on a common carrier basis.

(b) Licensees are subject to the requirements set forth in § 101.7.

(c) Any entity, other than one precluded by § 101.7, is eligible for authorization to provide service under this part. Authorization will be granted upon proper application filing and link coordination in accordance with the Commission's rules.

§ 101.1513 License term and renewal expectancy.

Because the licensee will obtain a single license for all of its facilities, the license renewal period will be ten years from the registration of the first link. Adding links will not change the overall renewal period of the license.

§ 101.1523 Sharing and coordination among non-Government licensees and between non-Government and Government services.

(a) Registration of each link in the 71-76 GHz, 81-86 GHz, and 92-95 GHz bands will be in the Universal Licensing System until the Wireless Telecommunications Bureau announces by public notice the implementation of a third-party database.

(b) Sharing and coordination among non-Federal Government links and between non-Federal Government and Federal Government links, shall occur according to the registration and coordination standards and procedures adopted in *Report & Order,* FCC 03-248, and as further detailed in subsequent implementation public notices issued consistent with that order. Protection of individual links against harmful interference from other links shall generally be granted to first-in-time registered links. Successful completion of coordination via the NTIA automated mechanism shall constitute successful non-Federal Government to Federal Government coordination for that individual link.

(c) In addition, the following types of non-Federal Government links require the filing with the Commission an FCC Form 601 for each link for the purpose of coordination and registration, in addition to registering each link in the third-party database:

(i) facilities requiring the submission of an Environmental Assessment,

(ii) facilities requiring international coordination, and

(iii) operation in quiet zones.

The Commission believes the licensee is in the best position to determine the nature of its operations and whether those operations impact these settings, and is required to submit to a database manager, as part of the registration package, documentation that an FCC Form 601 has been filed.

§ 101.1525 RF safety.

Licensees in the 70-80-90 GHz bands are subject to the exposure requirements found in Sections 1.1307(b), 2.1091 and 2.1093 of our Rules, and will use the parameters found therein.

§ Section 101.1527 Canadian and Mexican coordination.

(a) A licensee of bands 71.0-76.0, 81.0-86.0, 92-94 GHz and 94.1-95 GHz must comply with Section 1.928(f) of our rules, which pertains to coordination with Canada.

(b) A licensee of bands 71.0-76.0, 81.0-86.0, 92-94 GHz and 94.1-95 GHz must coordinate with Mexico in the following situations:

(1) For a station the antenna of which looks within the 200 deg. sector toward the Mexico-United States borders, that area in each country within 35 miles of the borders; and

(2) For a station the antenna of which looks within the 160 deg. sector away from the Canada-United States borders, that area in each country within 5 miles of the borders.

APPENDIX C: REQUIRED LINK DATA

A. Site Data

1. Date
2. License Call Sign
3. Latitude (D-M-S-0.1xS)
4. Longitude (D-M-S-0.1xS)
5. Elevation (m/AMSL)
6. Path Distance (km)
7. Path Status
    1. Proposed (start date – mm/dd/yy)
    2. Active (inception date – mm/dd/yy)

B. Antenna Data

1. Transmit Antenna Type (Manufacturer/model)
2. Transmit Antenna Gain (dBi)/ Beamwidth (D)
3. Transmit Antenna Center Line (m-AGL)
4. Transmit Antenna Azimuth (D)
5. Transmit Antenna Elevation Angle (D)
6. Receive Antenna Type (Manufacturer/model)
7. Receive Antenna Gain (dBi)/ Beam-width (D)
8. Receive Antenna Center Line (m-AGL)
9. Receive Antenna Azimuth (D)
10. Receive Antenna Elevation Angle (D)

C. Equipment Data

1. Transmitter Type (Manufacturer/model)
2. Transmitter Stability (%)
3. Maximum Transmitter Output Power (dBm)
4. Transmit Frequency (MHz)
5. Transmitter Emission Bandwidth
6. Minimum Transmitter output Power (if Automatic Transmitter Power Control is employed)
7. Transmitter Station Class
8. Transmitter Emission Designator
9. Data Type (video, voice, data, other)
10. Modulation Scheme (AM, FM, OFDM, QAM, others)
11. Receiver Type (Manufacturer/model)
12. Receiver Stability (%)

APPENDIX D: LIST OF COMMENTERS

Comments:

Boeing Company
Caltech Owens Valley Radio Observatory
Cisco Systems, Inc.
Comsearch
Electronic Data Systems
Endwave Corporation
Fixed Wireless Communications Coalition
Harris Corporation
i-Fi, LLC/BGI, Inc.
K.C.C. Inc.
Nickolaus E. Leggett
Loea Communications Corporation
National Academy of Sciences' Committee on Radio Frequencies
National Radio Astronomy Observatory
Sprint Corporation
Terabeam Corporation
Wi-Fi Alliance
Wireless Communications Association International, Inc.

Reply Comments:

Cisco Systems, Inc.
Comsearch
Harris Corporation
Loea Communications Corporation, Cisco Systems, Inc., Ceragon Networks, Endwave Corporation, Stratex Networks, Bridgewave Communications, Inc.
Loea Communications Corporation
National Telecommunications and Information Administration
Terabeam Corporation
Winstar Communications, LLC

SEPARATE STATEMENT OF CHAIRMAN MICHAEL K. POWELL

Re: ***Allocation and Service Rules for the 71-76 GHz, 81-86 GHz and 92-95 GHz Bands.***

Today, we open yet another new frontier in bringing the power of broadband Internet services to the American people. The spectrum bands at 71-76 GHz, 81-86 GHz, and 92-95 GHz are the highest frequency bands we have ever licensed. They join other broadband Internet platforms, both wireless—licensed, unlicensed and satellite—and wired—from powerline to DSL to cable to fiber-to-the home—in the increasingly competitive broadband Internet race.

The "millimeter wave" provides new and fertile ground for our Nation's entrepreneurs to harvest our vision of strong facilities-based competition, vibrant innovation, lower prices and consumer protection that will define our country's broadband Internet future. Proponents of networks in theses bands say they intend to use the spectrum to compete in the market for large volume telecommunications users. Ultimately, however, the highly advanced technology used here may encourage a broad range of new products and services, such as high-speed wireless local area networks and broadband access systems for the Internet.

The innovative, first-in-time licensing scheme we adopt today creates both the opportunities and incentives necessary to put spectrum to the highest and best use for the benefit of all consumers. Our approach embraces the non-exclusive technical characteristics of the very narrow beams that transmitters in these bands produce.

We have also created a productive partnership with the National Telecommunications and Information Administration (NTIA), currently under the able leadership of Deputy Assistant Secretary and Acting Assistant Secretary Michael D. Gallagher, to make these new communications opportunities possible. NTIA's flexibility and receptiveness to commercial use of these bands represents yet another way in which the agencies' cooperative management of the nation's spectrum resources encourages innovation, promotes investment and creates jobs for Americans.

SEPARATE STATEMENT OF COMMISSIONER MICHAEL J. COPPS

Re: Allocation and Service Rules for the 71-76 GHz, 81-86 GHz and 92-95 GHz Bands; Loea Communications Corporation Petition for Rulemaking (Report and Order; WT Doc No. 02-146; RM-10288)

Thanks to the Bureau for bringing us this item. It's surely good news that consumers will soon be able to make use of spectrum in the 70, 80, and 90 GHz range. My hope is that this decision will promote investment and assist us in bringing new broadband service to consumers. I am also pleased that we decide to extend our use of the unlicensed spectrum concept in portions of the 90 GHz band. I believe that we should look to using the unlicensed tool even more than we do today, consistent always, of course, with whatever public interest safeguards may be necessary.

I also want to note that this spectrum is licensed in a way that will encourage companies to initiate service without the need for extensive Commission action. And our licensing scheme recognizes the unique interference characteristics of this spectrum.

Spurring the use of this new technology will hopefully, one day, allow for more choices of broadband providers than those narrow choices available to consumers and businesses today. But we should never count our chickens before they hatch. Perhaps one day we will see millimeter wave wireless broadband, along with powerline broadband and other technologies, providing real intermodal competition. I also hope that these new technologies will not be dominated by the few companies that dominate currently available broadband technologies, and that they thereby reach their competitive potential. But until that wonderful day arrives, I hope that the Commission will not mistake the promise of future competition with the reality of today's limited competition when we make policy.

So I congratulate the Wireless Bureau for this item, and I'm eager to see the great things that this band brings us.

SEPARATE STATEMENT OF COMMISSIONER KEVIN J. MARTIN

Re: *Allocations and Service Rules for the 71-76 GHz, 81-86 GHz, and 92-95 GHz Bands; Loea Communications Corporation Petition for Rulemaking*, Report and Order, WT Docket No. 02-146, RM-10288

I am pleased to approve this item, which adopts service rules to facilitate commercial use of the 71-76 GHz, 81-86 GHz, and 92-95 GHz bands. As I have previously discussed, the amount of available spectrum is ultimately limited only by technology. *See generally* Separate Statement of Commissioner Kevin J. Martin, *Amendment of Part 2 of the Commission's Rules To Allocate Spectrum Below 3 GHz for Mobile and Fixed Services To Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems*, Memorandum Opinion and Order and Further Notice of Proposed Rulemaking, 16 FCC Rcd 16043 (2001). Today's Order illustrates that point. The 71-76 GHz, 81-86 GHz, and 92-95 GHz bands – which have wavelengths of about three to five millimeters – have never before been used commercially. Indeed, it was previously unclear how these bands could be used. Now, however, the private sector is experimenting with different uses for these bands, and this spectrum may ultimately be used commercially for high-speed wireless local area networks, broadband access systems for the Internet, point-to-point communications, and point-to-multipoint communications. I am pleased that we are facilitating these kind of services.

While, at present, the Commission must regard spectrum as a scarce natural resource, I am optimistic that future technological development will reduce this sense of scarcity. Such development may, as here, enable use of previously unusable spectrum bands and provide for more efficient use of the spectrum we are already using. Today's Order increases my optimism.

SEPARATE STATEMENT OF COMMISSIONER JONATHAN S. ADELSTEIN

Re: Allocations and Service Rules for the 71-76 GHz, 81-86 GHz and 92-95 GHz Bands; WT Docket No. 02-146

One of my goals as a policymaker is to maximize the services and information that flow over our airwaves. We already have seen the great success of WiFi, the rollout of broadband over satellite, and the continued deployment of high-speed connections over cellular and PCS spectrum and in the MDS/ITFS bands. Today, we continue to promote the development of wireless broadband by adopting service rules for wireless devices in the 71-76 GHz, 81-86 GHz and 92-95 GHz bands (70/80/90 GHz bands). Some of the services proposed for these bands include fiber-like first and last mile connections and wireless local area networks.

I am particularly pleased with our service rules for the 70/80/90 GHz bands because the licensing approach we adopt today truly serves the public interest. In Commission parlance, the item provides for a non-exclusive nationwide licensing approach with site-by-site coordination. In layman's terms, we are making it easy for our licensees to get access to spectrum for really fast connections – gigabit speeds. Of course, we do not yet know what the market will look like or what the equipment will cost, but we have made the FCC part of the equation as simple as possible.

While I continue to support auctions to resolve cases of mutual exclusivity for applicants seeking wide-area licenses (such as in the Advanced Wireless Services item we also adopt today), the public interest is not always served by adopting a licensing scheme that creates mutual exclusivity. We already have held auctions for spectrum similar to 70/80/90 GHz, only to see that spectrum lay relatively unused for years – that outcome does not serve the public interest.

We had an opportunity here to break that mold, and I am glad we did. In the context of spectrum management, I have said before that different spectrum bands require different approaches. It would be easier for all of us if we could do a "one size fits all" approach, but we cannot. Simply put, some bands, like 70/80/90 GHz, may be better suited for coordinated use; some bands (like the AWS bands) are not. Just as some bands will require unique interference criteria based on propagation characteristics, others may be subject to frequent coordination with NTIA.

But no matter what licensing approach we choose, we can, and have today, put in place a framework of rules and policies that will foster innovation in the 70/80/90 GHz bands more naturally. A framework that ensures interference issues are addressed, but allows technologies to flourish. A framework that encourages a market-based approach to spectrum management. A framework that gets spectrum and wireless broadband in the hands of people who will use it – no matter where they are, and no matter when they realize they might need the spectrum.